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on January 7, 2004

Milton L. Honig
MILTON L. HONIG
Reg. No. 28,617
Attorney for Applicant(s)

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PATENT

#02-0526-UNI

Case #C4251(C)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Batchelor
Serial No.: 10/671,286
Filed: September 25, 2003
For: COMPOSITION AND METHOD FOR BLEACHING A SUBSTRATE

Edgewater, New Jersey 07020
January 7, 2004

SUBMISSION OF PRIORITY DOCUMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Pursuant to rule 55(b) of the Rules of Practice in Patent Cases, Applicant(s) is/are submitting herewith a certified copy of the Great Britain Application No. 0222501.9 filed September 27, 2002, upon which the claim for priority under 35 U.S.C. § 119 was made in the United States.

It is respectfully requested that the priority document be made part of the file history.

Respectfully submitted,

Milton L. Honig

Milton L. Honig
Reg. No. 28,617
Attorney for Applicant(s)

MLH/mt
(201) 840-2403





INVESTOR IN PEOPLE

The Patent Office
Concept House
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South Wales
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1. Your reference **C4251 (C)/rkk** **27 SEP 2002**

2. Patent application number **0222501.9**
(The Patent Office will fill in this part)

3. Full name, address and postcode of the or of each applicant (underline all surnames)
**UNILEVER PLC
UNILEVER HOUSE, BLACKFRIARS
LONDON, EC4P 4BQ**

Patents ADP number (*if you know it*) **50426956002**

If the applicant is a corporate body, give the country/state of its incorporation **UNITED KINGDOM**

4. Title of the invention **COMPOSITION AND METHOD FOR BLEACHING A SUBSTRATE**

5. Name of your agent (*if you have one*) **ELLIOTT Peter William**

"Address for Service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)
**PATENT DEPARTMENT, UNILEVER PLC
COLWORTH HOUSE, SHARNBROOK
BEDFORD, MK44 1LQ**

Patents ADP number (*if you know it*) **59411439001**

6.	If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (<i>if you know it</i>) the or each application number	Country	Priority application number (<i>if you know it</i>)	Date of filing (<i>day / month / year</i>)
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7.	If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (<i>day/month/year</i>)
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (*Answer 'Yes' if:*) **YES**

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
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Description	20
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Priority Documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*) 1

Request for substantive examination (*Patents Form 10/77*)

Any other documents
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11. I/We request the grant of a patent on the basis of this application.

Signature(s)



Date: 27/09/02

Sandra Jane EDWARDS, Authorised Signatory

12. Name and daytime telephone number of person to contact in the United Kingdom

Ravinder K Kundra, Tel 01234 22 2439

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COMPOSITION AND METHOD FOR BLEACHING A SUBSTRATE**Field of Invention**

This invention relates to compositions and methods for
5 bleaching substrates.

Background of Invention

EP-B-311 175 to Unilever discloses a liquid sanitising
composition comprising at least 2% by weight of a caustic
10 agent such as sodium hydroxide, from 0 to 1% of a
surfactant, at least 3% by weight of an alkali metal
hypochlorite and an alkali metal neutral silicate. The
compositions disclosed in the EP-B-311 175 are used in
industrial machines for bulk ware washing or fabrics washing
15 to ensure an acceptable level of hygiene. The hypochlorite
has a tendency to attack the dyes of a fabric and to reduce
the integrity of the fabric *per se*.

Peroxygen bleaches are well known for their ability to
20 remove stains from substrates. Generally, these systems need
to be activated. One method of activation is to employ wash
temperatures of 60°C or higher. However, whilst these high
temperatures provide a hygiene benefit they often lead to
inefficient cleaning, and can also cause premature damage to
25 the substrate.

A preferred approach to generating hydroperoxyl bleach
radicals is the use of inorganic peroxides coupled with
organic precursor compounds. These systems are employed for
30 many commercial laundry powders. For example, various
European systems are based on tetraacetyl ethylenediamine

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(TAED) as the organic precursor coupled with sodium perborate or sodium percarbonate, whereas in the United States laundry bleach products are typically based on sodium nonanoyloxybenzenesulphonate (SNOBS) as the organic precursor coupled with sodium perborate.

Precursor systems are generally effective but still exhibit several disadvantages. For example, organic precursors are moderately sophisticated molecules requiring multi-step manufacturing processes resulting in high capital costs. Also, precursor systems have large formulation space requirements so that a significant proportion of a laundry powder must be devoted to the bleach components, leaving less room for other active ingredients and complicating the development of concentrated powders. Moreover, precursor systems do not bleach very efficiently in countries where consumers have wash habits entailing low dosage, short wash times, cold temperatures and low wash liquor to substrate ratios.

20

Summary of Invention

It is an object of the invention to provide an inexpensive bleaching composition. It is also an object to provide a bleaching composition having beneficial hygiene properties. We have found that iodine may be used at surprisingly low levels such that extinction coefficient of the iodine in the visible does not discolour a white textile.

The present invention provides a bleaching composition comprising: (a) iodine or a source thereof in the range from 0.0005 wt% to 5.0 wt %; and, (b) the balance carriers and

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adjunct ingredients. Preferably the iodine or source thereof is present in the range from 0.01 wt% to 3.0 wt%, most preferably from 0.02 wt% to 0.5 wt%. It is preferred that the iodine is present in the form of molecular iodine (I₂).

The present invention also extends to a method of bleaching a fabric stain, the method comprising the steps of contacting the fabric stain with the bleaching composition. Sun drying and thermal exposure serves to accelerate the bleaching effect. In use it is preferred that a wash liquor comprises a solution of iodine in the range from 3 to 30 ppm.

A preferred format is one in which the bleaching composition comprises a buffering agent and a surfactant. The buffering agent such that the composition in an aqueous medium provides pH in the range from 4 to 9, preferably from 7 to 9.

The bleaching composition of the present invention exhibits anti-dye transfer properties. The problem of dye transfer is most acute when a wash is conducted at high temperatures. Dye transfer problems are particularly problematic in Europe where high wash temperatures are found. The present invention also extends to a method of anti-dye transfer.

The present invention may also be used in the form of a pre-wash or post-wash treatment. Suitable treatment means for application to a textile material include sprays, pens, roller-ball devices, bars, soft solid applicator sticks and

impregnated cloths or cloths containing microcapsules. Such means are well known in the analogous art of deodorant application and/or in spot treatment of textiles. The bleaching composition may be applied using tapes, sheets or sticking plasters coated or impregnated with the substance, or containing microcapsules of the substance. The bleaching composition may for example be incorporated into a drier sheet so as to be activated or released during a tumble-drier cycle, or the substance can be provided in an impregnated or microcapsule-containing sheet so as to be delivered to the textile when ironed.

The present invention also extends to a commercial package comprising the bleaching composition of the present invention together with instructions for its use.

Iodine

Iodine may be used in a detergent composition specifically suited for stain bleaching purposes, and this constitutes a second aspect of the invention. In this regard, it is preferred that the bleaching composition comprises from 0.5 wt% to 50 wt% of a surfactant, preferably 5 wt% to 20 wt%.

In the preferred granular format, it is preferred that the iodine is coated or cogenerated with a substance that reduces the vapour pressure of the iodine. Suitable coatings and methods of application thereto are described in detail in WO9958632, herein incorporated by reference. It is preferred that the coating comprises one or more compounds selected from the group waxes, paraffin oils, fatty acids, esters of fatty acids, fatty alcohols, polyalkoxy fatty

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alcohols, polyalkoxy fatty acids, esters of polyalkoxy fatty acids, organic polymeric compounds, nonionic surfactants, starches, starch derivatives and inorganic minerals, preferably comprising clays, silicas, silicates and
5 borosilicates.

Another preferred bleaching format is one in which the iodine containing bleaching composition is in the form of a liquid format. Such a format overcomes any problem
10 associated with iodine vapour. In addition, in contrast to a peroxygen bleach, e.g., a perborate or percarbonate, that loses activity in a liquid format the liquid iodine bleach is more stable with respect to shelf-life when a hardened surfactant is present in contrast to an unsaturated
15 surfactants.

It is within the scope of this invention for the iodine to be generated *in situ* (a source thereof). An example of the in situ generation of iodine is the catalysed decomposition
20 of iodate (IO_3^-).

The Detergent Composition

The surfactant used in the present invention has an HLB (hydrophilic/lipophilic balance) greater than 5, more
25 preferably greater than 10, and most preferably greater than 15. For a discussion of HLB the reader is directed to an article by Griffin, W. C. in J. Soc. Cosmetic Chemists Vol. 1 page 311, 1945 and Davies, J. T. and Rideal, E. K. in Interfacial Phenomena, Acad. Press, NY, 1961, pages 371 to
30 382. The HLB value requirement reflects the importance of the rate of solubility and dispersibility of the surfactant

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having a degree of hydroperoxide present from the bleaching composition to the aqueous wash medium inconjunction with surface activity towards the substrate being washed.

5 This surfactant system may in turn comprise 0 to 95 % by weight of one or more anionic surfactants and 5 to 100 % by weight of one or more nonionic surfactants. The surfactant system may additionally contain amphoteric or zwitterionic detergent compounds, but this is not normally desired owing
10 to their relatively high cost.

In general, the nonionic and anionic surfactants of the surfactant system may be chosen from the surfactants described "Surface Active Agents" Vol. 1, by Schwartz &
15 Perry, Interscience 1949, Vol. 2 by Schwartz, Perry & Berch, Interscience 1958, in the current edition of "McCutcheon's Emulsifiers and Detergents" published by Manufacturing Confectioners Company or in "Tenside-Taschenbuch", H. Stache, 2nd Edn., Carl Hauser Verlag, 1981.

20 Suitable nonionic detergent compounds which may be used include, in particular, the reaction products of compounds having a hydrophobic group and a reactive hydrogen atom, for example, aliphatic alcohols, acids, amides or alkyl phenols
25 with alkylene oxides, especially ethylene oxide either alone or with propylene oxide. Specific nonionic detergent compounds are C₆-C₂₂ alkyl phenol-ethylene oxide condensates, generally 5 to 25 EO, i.e. 5 to 25 units of ethylene oxide per molecule, and the condensation products of aliphatic C₈-
30 C₁₈ primary or secondary linear or branched alcohols with ethylene oxide, generally 5 to 40 EO.

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Suitable anionic detergent compounds which may be used are usually water-soluble alkali metal salts of organic sulphates and sulphonates having alkyl radicals containing from about 8 to about 22 carbon atoms, the term alkyl being
5 used to include the alkyl portion of higher acyl radicals. Examples of suitable synthetic anionic detergent compounds are sodium and potassium alkyl sulphates, especially those obtained by sulphating higher C₈-C₁₈ alcohols, produced for example from tallow or coconut oil, sodium and potassium
10 alkyl C₉-C₂₀ benzene sulphonates, particularly sodium linear secondary alkyl C₁₀-C₁₅ benzene sulphonates; and sodium alkyl glyceryl ether sulphates, especially those ethers of the higher alcohols derived from tallow or coconut oil and synthetic alcohols derived from petroleum. The preferred
15 anionic detergent compounds are sodium C₁₁-C₁₅ alkyl benzene sulphonates and sodium C₁₂-C₁₈ alkyl sulphates. Also applicable are surfactants such as those described in EP-A-328 177 (Unilever), which show resistance to salting-out, the alkyl polyglycoside surfactants described
20 in EP-A-070 074, and alkyl monoglycosides.

Preferred surfactant systems are mixtures of anionic with nonionic detergent active materials, in particular the groups and examples of anionic and nonionic surfactants
25 pointed out in EP-A-346 995 (Unilever). Especially preferred is surfactant system that is a mixture of an alkali metal salt of a C₁₆-C₁₈ primary alcohol sulphate together with a C₁₂-C₁₅ primary alcohol 3-7 EO ethoxylate.

30 The nonionic detergent is preferably present in amounts greater than 10%, e.g. 25 to 90% by weight of the surfactant

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system. Anionic surfactants can be present for example in amounts in the range from about 5% to about 40% by weight of the surfactant system.

- 5 The detergent composition may take any suitable physical form, such as a powder, granular composition, tablets, a paste or an anhydrous gel.

Peroxygen Bleach or Source Thereof

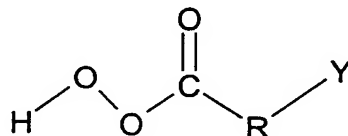
- 10 The bleaching composition of the present invention may also comprise peroxy bleaching species. The peroxy bleaching species may be a compound that is capable of yielding hydrogen peroxide in aqueous solution. Hydrogen peroxide sources are well known in the art. They include the alkali
15 metal peroxides, organic peroxides such as urea peroxide, and inorganic persalts, such as the alkali metal perborates, percarbonates, perphosphates persilicates and persulphates. Mixtures of two or more such compounds may also be suitable.
- 20 Particularly preferred are sodium perborate tetrahydrate and, especially, sodium perborate monohydrate. Sodium perborate monohydrate is preferred because of its high active oxygen content. Sodium percarbonate may also be preferred for environmental reasons. The amount thereof in
25 the composition of the invention usually will be within the range from about 0.1 to 25 wt%, preferably from 4 to 25 wt%. One skilled in the art will appreciate that these amounts may be reduced in the presence of a bleach precursor e.g., N,N,N'N'-tetraacetyl ethylene diamine (TAED).

When the iodine is present alone without a peroxygen bleach or source thereof the pH of the wash liquor is not important however when a peroxygen bleach or source thereof is present is preferred that the wash liquor is alkaline, i.e., in the
5 range from 7 to 11.

Another suitable hydrogen peroxide generating system is a combination of a C1-C4 alkanol oxidase and a C1-C4 alkanol, especially a combination of methanol oxidase (MOX) and
10 ethanol. Such combinations are disclosed in International Application PCT/EP 94/03003 (Unilever), which is incorporated herein by reference.

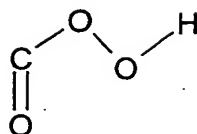
Alkylhydroxy peroxides are another class of peroxy bleaching
15 compounds. Examples of these materials include cumene hydroperoxide and t-butyl hydroperoxide.

Organic peroxyacids may also be suitable as the peroxy bleaching compound. Such materials normally have the general
20 formula:



wherein R is an alkylene or substituted alkylene group containing from 1 to about 20 carbon atoms, optionally
25 having an internal amide linkage; or a phenylene or substituted phenylene group; and Y is hydrogen, halogen, alkyl, aryl, an imido-aromatic or non-aromatic group, a COOH or

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group or a quaternary ammonium group.

5 Typical monoperoxy acids useful herein include, for example:

(i) peroxybenzoic acid and ring-substituted peroxybenzoic acids, e.g. peroxy-.alpha.-naphthoic acid;

10 (ii) aliphatic, substituted aliphatic and arylalkyl monoperoxyacids, e.g. peroxy lauric acid, peroxy stearic acid and N,N-phthaloylaminoperoxy caproic acid (PAP); and

(iii) 6-octylamino-6-oxo-peroxyhexanoic acid.

15

Typical diperoxyacids useful herein include, for example:

(iv) 1,12-diperoxydodecanedioic acid (DPDA);

20 (v) 1,9-diperoxyazelaic acid;

(vi) diperoxybrassicilic acid; diperoxysebacic acid and diperoxyisophthalic acid;

25 (vii) 2-decyldiperoxybutane-1,4-dioic acid; and

(viii) 4,4'-sulphonylbisperoxybenzoic acid.

Also inorganic peroxyacid compounds are suitable, such as for example potassium monopersulphate (MPS). If organic or inorganic peroxyacids are used as the peroxygen compound, the amount thereof will normally be within the range of
5 about from 2 to 10% by weight, preferably from 4 to 8% by weight.

Peroxyacid bleach precursors are known and amply described in literature, such as in the British Patents 836988;
10 864,798; 907,356; 1,003,310 and 1,519,351; German Patent 3,337,921; EP-A-0185522; EP-A-0174132; EP-A-0120591; and U.S. Pat. Nos. 1,246,339; 3,332,882; 4,128,494; 4,412,934 and 4,675,393.

15 Another useful class of peroxyacid bleach precursors is that of the cationic i.e. quaternary ammonium substituted peroxyacid precursors as disclosed in US Pat. Nos. 4,751,015 and 4,397,757, in EP-A0284292 and EP-A-331,229. Examples of peroxyacid bleach precursors of this class are:

20

2-(N,N,N-trimethyl ammonium) ethyl sodium-4-sulphonphenyl carbonate chloride (SPCC);

25

N-octyl-N,N-dimethyl-N10-carbophenoxy decyl ammonium chloride (ODC);

3-(N,N,N-trimethyl ammonium) propyl sodium-4-sulphophenyl carboxylate; and

30 N,N,N-trimethyl ammonium toluoyloxy benzene sulphonate.

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A further special class of bleach precursors is formed by the cationic nitriles as disclosed in EP-A-303,520 and in European Patent Specification No.'s 458,396 and 464,880.

- 5 Any one of these peroxyacid bleach precursors can be used in the present invention, though some may be more preferred than others.

10 Of the above classes of bleach precursors, the preferred classes are the esters, including acyl phenol sulphonates and acyl alkyl phenol sulphonates; the acyl-amides; and the quaternary ammonium substituted peroxyacid precursors including the cationic nitriles.

15 Examples of said preferred peroxyacid bleach precursors or activators are sodium-4-benzoyloxy benzene sulphonate (SBOBS); N,N,N',N'-tetraacetyl ethylene diamine (TAED); sodium-1-methyl-2-benzoyloxy benzene-4-sulphonate; sodium-4-methyl-3-benzoyloxy benzoate; SPCC; trimethyl ammonium
20 toluyloxy-benzene sulphonate; sodium nonanoyloxybenzene sulphonate (SNOBS); sodium 3,5,5-trimethyl hexanoyl-oxybenzene sulphonate (STHOBS); and the substituted cationic nitriles.

25 Other classes of bleach precursors for use with the present invention are found in WO0015750, for example 6-(nonanamidocaproyl)oxybenzene sulphonate.

The precursors may be used in an amount of up to 12%,
30 preferably from 2-10% by weight, of the composition.

Enzymes

The detergent compositions of the present invention may additionally comprise one or more enzymes, which provide cleaning performance, fabric care and/or sanitation
5 benefits.

Said enzymes include oxidoreductases, transferases, hydrolases, lyases, isomerases and ligases. Suitable members of these enzyme classes are described in Enzyme nomenclature
10 1992: recommendations of the Nomenclature Committee of the International Union of Biochemistry and Molecular Biology on the nomenclature and classification of enzymes, 1992, ISBN 0-12-227165-3, Academic Press.

15 Examples of the hydrolases are carboxylic ester hydrolase, thiolester hydrolase, phosphoric monoester hydrolase, and phosphoric diester hydrolase which act on the ester bond; glycosidase which acts on O-glycosyl compounds; glycosylase hydrolysing N-glycosyl compounds; thioether hydrolase which
20 acts on the ether bond; and exopeptidases and endopeptidases which act on the peptide bond. Preferable among them are carboxylic ester hydrolase, glycosidase and exo- and endopeptidases. Specific examples of suitable hydrolases include (1) exopeptidases such as aminopeptidase and
25 carboxypeptidase A and B and endopeptidases such as pepsin, pepsin B, chymosin, trypsin, chymotrypsin, elastase, enteropeptidase, cathepsin B, papain, chymopapain, ficain, thrombin, plasmin, renin, subtilisin, aspergillopepsin, collagenase, clostripain, kallikrein, gastricsin, cathepsin
30 D, bromelain, chymotrypsin C, urokinase, cucumisin, oryzin, proteinase K, thermomycolin, thermitase, lactocepin,

thermolysin, bacillolysin. Preferred among them is subtilisin; (2) glycosidases such as α -amylase, β -amylase, glucoamylase, isoamylase, cellulase, endo-1,3(4)- β -glucanase (β -glucanase), xylanase, dextranase, polygalacturonase (pectinase), lysozyme, invertase, hyaluronidase, pullulanase, neopullulanase, chitinase, arabinosidase, exocellobiohydrolase, hexosaminidase, mycodextranase, endo-1,4- β -mannanase (hemicellulase), xyloglucanase, endo- β -galactosidase (keratanase), mannanase and other saccharide gum degrading enzymes as described in WO-A-99/09127. Preferred among them are α -amylase and cellulase; (3) carboxylic ester hydrolase including carboxylesterase, lipase, phospholipase, pectinesterase, cholesterol esterase, chlorophyllase, tannase and wax-ester hydrolase. Preferred among them is lipase.

Examples of transferases and ligases are glutathione S-transferase and acid-thiol ligase as described in WO-A-98/59028 and xyloglycan endotransglycosylase as described in WO-A-98/38288.

Examples of lyases are hyaluronate lyase, pectate lyase, chondroitinase, pectin lyase, alginase II. Especially preferred is pectolyase, which is a mixture of pectinase and pectin lyase.

Examples of the oxidoreductases are oxidases such as glucose oxidase, methanol oxidase, bilirubin oxidase, catechol oxidase, laccase, peroxidases such as ligninase and those described in WO-A-97/31090, monooxygenase, dioxygenase such as lipoxxygenase and other oxygenases as described in

WO-A-99/02632, WO-A-99/02638, WO-A-99/02639 and the cytochrome based enzymatic bleaching systems described in WO-A-99/02641.

5 The activity of oxidoreductases, in particular the phenol oxidising enzymes in a process for bleaching stains on fabrics and/or dyes in solution and/or antimicrobial treatment can be enhanced by adding certain organic compounds, called enhancers. Examples of enhancers are 2,2'-
10 azo-bis-(3-ethylbenzo-thiazoline-6-sulphonate (ABTS) and Phenothiazine-10-propionate (PTP). More enhancers are described in WO-A-94/12619, WO-A-94/12620 , WO-A-94/12621, WO-A-97/11217, WO-A-99/23887. Enhancers are generally added at a level of 0.01% to 5% by weight of detergent
15 composition.

Builders, polymers and other enzymes as optional ingredients may also be present as found in WO0060045.

20 Suitable detergency builders as optional ingredients may also be present as found in WO0034427.

The invention will now be further illustrated by way of the following non-limiting examples:

25

Example 1

Staines were created on white woven cotton by placing three drops of either

- 30 (a) 0.1% wt. solution of beta-carotene in sunflower oil,
or
(b) saturated solution of turmeric in sunflower oil.

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The stains were washed at 30°C in 300 ml of water containing 2.1 g of Persil Colour™ washing powder. The wash contained two beta-carotene stained cloths, two turmeric stained cloths and two clean pieces of cotton cloth (white ballast), with a total weight of 5g. After the wash the cloths were rinsed in an acidic solution, dried in a tumble dryer for 10 minutes and the residual staining relative to clean white cloth measured using a reflectometer and expressed as the ΔE value. The discoloration of the white ballast due to transfer of coloured matter in the wash was measured in an analogous manner.

The experiment was repeated but excess iodine (I_2) was added to the wash liquor to give a saturated solution of iodine (Iodine solubility in water at 25°C is 340mg/kg). The results are shown in Table 1:

Cloth	Control/ ΔE (av)	Iodine/ ΔE (av)
Beta-carotene	26.4	28.8
Turmeric	34.9	18.9
White ballast	2.7	0.3

Table 1

From Table 1 it is evident that the use of iodine reduces the staining of the turmeric stain and reduces transfer of colour to the white ballast.

Example 2

The experimental was similar to that of Example 1; 150 ml of water at 40 °C was used with 1g of Persil Colour and following the wash and rinse the stains were irradiated in a

Weatherometer for 12 minutes. The Weatherometer produces artificial sunlight and simulates line drying. The cloth weighed a total of 6.4g and had been aged over night. The turmeric stains were created with four drops of the oil.

5

The results of the wash are given in Table 2 and clearly show stain removal on both stains and a reduction in stain transfer to white cotton.

Cloth sample/stain	Control/ ΔE (av)	Iodine/ ΔE (av)
Beta-carotene	16.0	6.3
Turmeric	22.0	5.8
White ballast	4.4	2.3

10 Table 2

A large reduction in colour transfer to the white ballast was observed.

15 **Example 3**

Turmeric stains were prepared by the method described in Example 1. Two turmeric and two white cotton ballast pieces were washed for 20 minutes at 40 °C in 150ml of demineralised water with 1 g of Persil Colour Powder added. Following the wash the clothes were rinsed in dilute acidic solutions and in demineralised water and then iron dried. The discolouration of the ballast pieces were then measured and as expressed as ΔE values relative to the original. Washes were repeated but adding various amount of iodine, from a 5% solution in ethanol. The results are given in the Table 2 below.

Equivalent weight Iodine on formulation	Iodine (ppm) in solution	ΔE
0%	0	8.6
0.090%	6	7.4
0.180%	12	5.8
0.360%	24	2.6
0.720%	48	2.3
1.801%	120	1.6

Table 3

For all levels of iodine used the stain transfer was
5 reduced.

Example 4

Stains were created on white woven cotton by placing one drop
of either

- 10 (a) 0.1% wt. solution of beta-carotene in sunflower oil
or
(b) saturated solution of turmeric in sunflower oil.

The stains were washed at 25°C in 100 ml of water containing
15 0.5g of WISKTM washing liquid. The pH of the wash liquor was
8.4. The wash contained two beta-carotene, two turmeric
stains and two clean pieces of cotton, with a total weight of
4g. Following the wash the cloths were rinsed then ironed dry
using a convention iron. The residual staining relative to
20 clean white cloth measured using a reflectometer and
expressed as the ΔE value. The discoloration of the white
ballast due to transfer of coloured matter in the wash was
measured and expressed as the %reflectance at 460nm.

The experiment was repeated but Iodine (I_2) was added from a 4.7% ethanol solution, such that there was 17ppm Iodine in the wash (corresponding to 0.33% on weight formulation). The results are shown in Table 4:

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Cloth	Control/ ΔE (av)	Iodine/ ΔE (av)
Beta-carotene	12.0	3.3
Turmeric	29.4	14.6
	R460 (average)	
White ballast	90.0	95.5

Table 4

Following the wash the turmeric and white ballast from the iodine wash were whiter/cleaner than the control. No
10 difference was observed between the beta-carotene stains until the stains were ironed.

Example 6

Beta-carotene and turmeric stains were created as per Example
15 1, except two drops of oil were used per stain. Two of the beta-carotene stains, two of the turmeric stains and two clean white pieces of cotton (total weight 2.8g) were washed in 100ml of 25°C water containing 0.1g of sodium dodecyl sulfate as a surfactant and buffered to pH = 2 using standard
20 salts. After 15 minutes in the wash solution the clothes were removed and thoroughly rinsed in water then wrung. The ΔE of the damp clothes was then measured relative to clean white cotton. Following this the clothes were left to dry for 30 minutes in air then briefly ironed until dry and the ΔE re-
25 measured relative to dry clean white cotton. The experiment

was repeated with iodine added to the wash liquor (34ppm in solution).

The experiment was repeated except the solution was buffered
5 to pH 5, 8 and 11.

The results are shown in the Tables below.

	ΔE (average)					
	White cotton		Turmeric stain		Beta-carotene stains	
Ph	control	iodine	control	iodine	control	iodine
2	4.0	0.5	54.0	42.0	38.5	18.9
5	2.9	0.4	55.7	18.5	42.4	19.1
8	4.1	0.6	48.2	16.9	43.5	10
11	2.8	1.1	52.6	38.8	47.9	44.8

Table 5 wet results

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	ΔE (average)					
	White cotton		Turmeric stain		Beta-carotene stains	
pH	control	iodine	control	iodine	control	iodine
2	3.1	0.6	42.7	34.7	26.2	11.7
5	2.4	0.4	43.5	20.0	28.4	10.2
8	2.7	0.3	37.7	14.1	28.6	5.1
11	2.6	0.7	41.5	28.1	29.4	31.4

Table 6 dry results

From Table 6 it can be seen that the benefits are observed immediately post wash and after drying. The benefits are pH
15 dependent, increasing in the order (i.e. smallest first) pH 11, 2, 5 then 8.

Claims:

1. A bleaching composition comprising:

(a) iodine or a source thereof in the range from 0.0005
wt% to 5.0 wt %; and,

(b) the balance carriers and adjunct ingredients.

2. A bleaching composition according to claim 1, wherein
the iodine or source thereof is present in the range
from 0.01 wt% to 3.0 wt%.

3. A bleaching composition according to claim 1, wherein
the iodine or source thereof is present in the range
from 0.02 wt% to 0.5 wt%.

4. A bleaching composition according to any preceding
claim, wherein the iodine or source thereof is coated or
cogranulated with a substance that reduces the vapour
pressure of iodine.

5. A bleaching composition according to any preceding
claim, wherein the bleaching composition comprises a
peroxide in the range from 0.1 to 25 % wt selected from
the group consisting of: inorganic peroxides, inorganic
persulphates and organic peracids.

6. A bleaching composition according to claim 5, wherein
the peroxide is selected from the sodium percarbonate
and sodium perborate.

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7. A bleaching composition according to claim 5 or 6,
wherein the bleaching composition comprises a bleach
activator.

5 8. A bleaching composition according to claim 7, wherein
the bleaching composition comprises N,N,N'N'-tetraacetyl
ethylene diamine.

9. A bleaching composition according to any preceding
10 claim, wherein the bleaching composition comprises a
surfactant in the range from 0.5 wt% to 50 wt %.

10. A bleaching composition according to claim 9, wherein
the bleaching composition comprises a surfactant in the
15 range from 5 wt% to 20 wt%.

11. A bleaching composition according to any preceding
claim, wherein the bleaching composition comprises an
enzyme.

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12. A bleaching composition according to any preceding
claim, wherein the bleaching composition comprises a
builder.

25 13. Use of the bleaching composition as defined in any
preceding claim for bleaching a textile stain.

14. A liquor comprising the bleaching composition as defined
in any one of claims 1 to 12.

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15. A liquor according to claim 14, wherein the liquor is an aqueous liquor.

5 16. A liquor according to claim 14 or 15, wherein iodine is present in solution in a concentration in the range from 3 to 30 ppm.

17. A liquor according to claim 14, wherein the liquor is a non-aqueous.

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18. A liquor according to claim 15 or 16, wherein the liquor is buffered in the pH range from 4 to 9.

15 19. A liquor according to claim 18, wherein the liquor is buffered in the pH range from 7 to 9.

Abstract of the Invention

The present invention provides a bleaching composition comprising iodine.